



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/722,293

11/25/2003

Toshiaki Yoshihara

1100.68757

9096

7590 02/13/2007
Patrick G. Burns, Esq.
GREER, BURNS & CRAIN, LTD.
Suite 2500
300 South Wacker Dr.
Chicago, IL 60606

EXAMINER

SHAPIRO, LEONID

ART UNIT

PAPER NUMBER

2629

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

02/13/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/722,293

Applicant(s)

YOSHIHARA ET AL.

Examiner

Leonid Shapiro

Art Unit

2629

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4,5,7,8,11 and 13 is/are allowed.
- 6) ☒ Claim(s) 1-2,6,9-10,14-19 is/are rejected.
- 7) ☒ Claim(s) 3 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-2,6,9-10,14 are rejected under 35 U.S.C. 102(b) as being anticipated by Akiyama (US Patent No. 6,278,426 B1).

As to claim 1, Akiyama teaches a liquid crystal display device having a liquid crystal material with spontaneous polarization (See Col. 1, Lines 20-26) sealed between a common electrode and a plurality of pixel electrodes (See Figs. 4-5, items 227-228, from Col. 7, Line 60 to Col. 8, Line 37), and switching elements provided to correspond with said plurality of pixel electrodes (See Figs. 3-5, item 206, Col. 7, Lines 54-59), respectively, comprising

an applying unit for applying voltage of same polarity to said liquid crystal material through said switching elements a plurality of times continuously within one frame or sub-frame (See Col. 10, Lines 8-19).

As to claim 2, Akiyama teaches the voltages applied to said liquid crystal material by the plurality of times of voltage application are equal in magnitude (See Col. 10, Lines 8-19).

As to claim 6, Akiyama teaches a combination of magnitude of voltages to be applied to said liquid crystal material a plurality of times is set so as to display a predetermined grayscale level (See Col. 2, Lines 26-29).

As to claims 9-10, Akiyama teaches after applying voltages of same polarity to said liquid crystal material a plurality of times, said applying unit applies reverse voltages, which are reversed in polarity and equal in magnitude with respect to said applied voltages, to said liquid crystal material the same number of times as the plurality of times (See Col. 10, Lines 8-19).

As to claim 14, Akiyama teaches liquid crystal material is a ferroelectric liquid crystal material (See Col.2, Lines 20-26).

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 12,17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama.

As to claim 12, Akiyama teaches a liquid crystal display device having a liquid crystal material with spontaneous polarization (See Col. 1, Lines 20-26) sealed between a common electrode and a plurality of pixel electrodes (See Figs. 4-5, items 227-228, from Col. 7, Line 60 to Col. 8, Line 37), and switching elements provided to correspond with said plurality of pixel electrodes (See Figs. 3-5, item 206, Col. 7, Lines 54-59), respectively, comprising:

a first mode in which voltage of same polarity is applied to said liquid crystal material through said switching elements a plurality of times continuously within one frame (in the reference is equivalent to one line period) (See Fig. 15, items V_g , V_{c1} - V_{c2}) or sub-frame and a second mode in which voltage of the same polarity is applied to said liquid crystal material through said switching elements once within the one frame or sub-frame (in the reference is equivalent to one line period) (See Fig. 22, items V_g , V_{c1} - V_{c2}).

Akiyama does not disclose a switching unit between a first and second mode.

It would have been obvious to one of ordinary skill in the art at the time of invention to incorporate a switch into Akiyama system in order to improve contrast ratio and response time (See Col. 3, Lines 29-45 in Akiyama reference).

As to claim 17, Akiyama teaches liquid crystal material is a ferroelectric liquid crystal material (See Col.2, Lines 20-26).

4. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama as applied to claim 1 above, and further in view of Shigeta (US Patent No. 6,972,777 B2).

As to claim 15, Akiyama does not disclose a light source for emitting at least light of three primary colors, wherein a color display is performed by switching the colors of light emitted by said light source in a time-divided manner in synchronism with on/off driving of said switching elements.

Shigeta teaches disclose a light source for emitting at least light of three primary colors (See Fig.1, items RGB, Col. 9, Lines 19-25), wherein a color display is performed by switching the colors of light emitted by said light source in a time-divided manner in synchronism with on/off driving of said switching elements (See Fig.2, items RGB, Col. 10, Lines 29-59).

It would have been obvious to one of ordinary skill in the art at the time of invention to use switch and incorporate teachings of Shigeta into Akiyama system in order to a high quality image (See Col. 5, Lines 10-15 in the Shigeta reference).

As to claim 16, Shigeta teaches a light source for emitting white light (See Fig. 3, item 3-6) ; and

color filters in a plurality of colors (See Fig. 3, item 3-12),

wherein a color display is performed by selectively transmitting the emitted light from said light source through said color filters (See Col. 9, Lines 11-18).

5. Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akiyama as applied to claim 12 above, and further in view of Shigeta.

As to claim 18, Akiyama does not disclose a light source for emitting at least light of three primary colors, wherein a color display is performed by switching the colors of light emitted by said light source in a time-divided manner in synchronism with on/off driving of said switching elements.

Shigeta teaches disclose a light source for emitting at least light of three primary colors (See Fig.1, items RGB, Col. 9, Lines 19-25), wherein a color display is performed

Art Unit: 2629

by switching the colors of light emitted by said light source in a time-divided manner in synchronism with on/off driving of said switching elements (See Fig.2, items RGB, Col. 10, Lines 29-59).

It would have been obvious to one of ordinary skill in the art at the time of invention to use switch and incorporate teachings of Shigeta into Akiyama system in order to a high quality image (See Col. 5, Lines 10-15 in the Shigeta reference).

As to claim 19, Shigeta teaches a light source for emitting white light (See Fig. 3, item 3-6) ; and

color filters in a plurality of colors (See Fig. 3, item 3-12),

wherein a color display is performed by selectively transmitting the emitted light from said light source through said color filters (See Col. 9, Lines 11-18).

Response to Arguments

6. Applicant's arguments filed 11/30/06 in relation to claims 1-2,6,9-10,14 have been fully considered but they are not persuasive:

On page 13, 1st paragraph of Remark Applicant's stated that Since Akiyama fails to disclose or suggest applying a voltage of a same polarity within one frame or one sub-frame, withdrawal of the §102 rejection of claims 1-2, 6, 9-10, and 14 is respectfully requested. However, Akiyama reference related to an anti-ferroelectric crystal and the response time is much faster than the frame time and even the line time (See Col. 1, Lines 27-42) and Figs. 7, 15 and 22 disclosed one or more

Art Unit: 2629

voltages of the same polarity within the line time (See Figs. 7, 15 and 22, items Tg, Vg), which is much smaller than the frame or subframe time.

7. Applicant's arguments with respect to claim 12 and 17 have been considered but are moot in view of the new ground(s) of rejection.

Allowable Subject Matter

8. Claims 4-5, 7-8, 11, 13 are allowed.

Relative to claims 4-5 the major difference between the teaching of the prior art of record (Akiyama, Sigeta) and the instant invention is that a magnitude of the voltage applied for the (n+1)th (n: natural number) time is not less than a magnitude of the voltage of said liquid crystal material just before the (n+1)th application of voltage after the nth application of voltage.

Relative to claim 7 the major difference between the teaching of the prior art of record (Akiyama, Shigeta) and the instant invention is a greater number of grayscales are displayed compared to the number of output grayscales of said applying unit.

Relative to claim 8 the major difference between the teaching of the prior art of record (Akiyama, Shigeta) and the instant invention that is if the number of times of application of voltage of same polarity to said liquid crystal material within one period is N times (N: natural number), lowest grayscale levels are displayed by the Nth application of voltage, higher grayscale levels than the grayscale levels displayed by the

Art Unit: 2629

Nth application of voltage are sequentially displayed by a combination of the Jth ($2 < j < N$) through Nth applications of voltage, and highest grayscale levels are displayed by a combination of the 1st through Nth applications of voltage.

Relative to claim 11 the major difference between the teaching of the prior art of record (Akiyama, Shigeta) and the instant invention that is a backlight is turned off in synchronism with an end of the first application of the reverse voltage.

Relative to claim 13 the major difference between the teaching of the prior art of record (Akiyama, Nakanowatari and Shigeta) and the instant invention that is switching unit switches between the first and second mode, based on a temperature.

9. Claim 3 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Relative to claim 3 the major difference between the teaching of the prior art of record (Akiyama and Shigeta) and the instant invention that is at least two voltages among the voltages applied to said liquid crystal material by the plurality of times of voltage application are different in magnitude.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2629

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Telephone Inquire

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Shapiro whose telephone number is 571-272-7683. The examiner can normally be reached on 8 a.m. to 5 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Hjerpe can be reached on 571-272-7691. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2629

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LS
02.12.07



RICHARD HJERPE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600